Policy Challenges and Options

Consistent with other recent forest assessments outside of California, this assessment frames the underlying forest and rangeland policy issues around sustainability. Defined by the Bruntland Commission Report, sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." Assessing sustainability requires addressing social, economic, and environmental dimensions with respect to our forests and rangelands. To be most effective, policies must consider crosscutting actions that simulatneously address the broad criteria that encompass sutainability.

By law, the next step is for the California State Board of Forestry and Fire Protection to use this assessment to draft a Forest Policy Statement. Then, the Board must hold hearings on both the Assessment and the Policy Statement.

The Assessment ultimately raises the question of whether existing institutions can deal with the complexity of California's forest and rangeland resources. The challenge is to integrate these issues into a cohesive policy that works toward common ends.

Policy Challenges and Options for California's Landscapes

To promote sustainability, policies must address the environmental, economic, and social dimensions of forests and rangelands (Figure 92). Sustainable forest conditions must simultaneously address a wide range of habitats and species, maintain productive lands, protect soil, water, and air quality as well as improve social well being.

Forest policies that deal with uncertainty and promote sustainability will play out differently based on land management and use patterns throughout California's forests and rangelands. Policies must also be tailored to the unique spatial characteristics of the problem, from small watersheds to large bioregions. At various levels of spatial resolution, a number of landscape classifications with similar current and potential management options can be used to more accurately define the key challenges and options. The basic landscape types are Urban, Agriculture, Working, and Reserve. The Working Landscape is further broken up into Private, Public, Rural Residential and Sparsely Populated subcategories.

The Assessment identified a number of general challenges that occur in one or more landscape classes at the same time and are often connected by direct proximity or shared components (Figure 93). Policies and solutions must consider the wide variety of ownership patterns, management goals, and constraints that occur in each of the landscape classes for overall landscape-level goals to be achieved. In most cases, a mix of management actions (e.g., stewardship, protection, restoration) will be required in each class to address the challenges. Typical concerns of each landscape follow.

Figure 92. Components of forest and rangeland resource sustainability

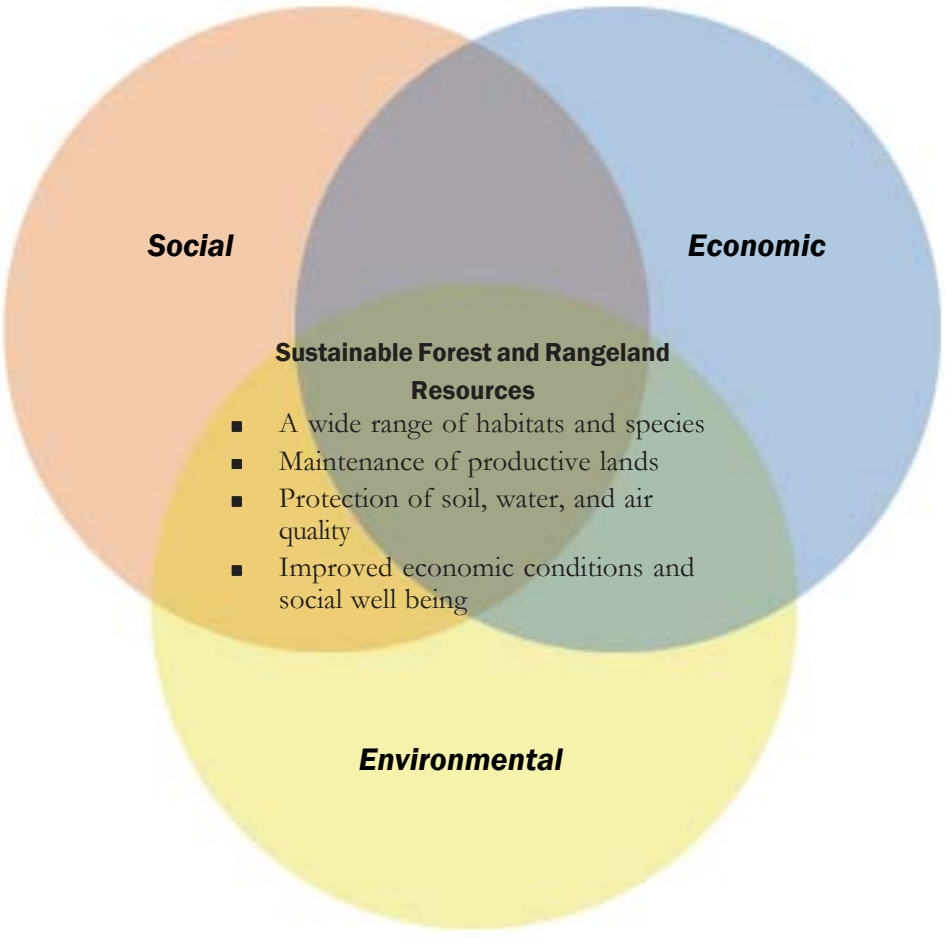


Figure 93. Policy challenges and landscapes

	Challenges	Landscapes Affected by Challenges
1 Biological diversity	Gaps in Wildlife habitat structure Decline in some native species Using all landscapes to meet biological diversity goals	
2 Productive capacity	Declining land base and administrative withdrawls of land available for timber and range production Risks and impacts from increased forest stocking levels Decline in rangeland area and availablitiy	*Urban*
3 Forest health	Managing forest structure for productivity, habitats, and forest health goals Management of metropolitan and interface forests and rangelands Public understanding of management practices Forest and rangeland conversions Fuels buildup risks to ecosystem and human assets Elevated pest damage related to forest stocking levels Emerging pest and disease threats to unique habitats and livestock health Impacts of exotic and invasive species to biological diversity and rangeland productivity Increasing air pollution in several regions	*Agriculture* *Metropolitan* *Rural Residential*
4 Soil conservation and water quality	Improve watershed condition Fish habitat restoration Measure cumulative watershed impacts from multiple users	*Working/Private*
5 Forests and climate	Understanding and responding to climate change	*Working/Public*
6 Socio–economic well being	Rising consumption and statewide limitations on California commodity output Meeting changing demands for recreation and open space Meeting costs of resource protection Incentives for private production of ecosystem services Maintaining large landholdings in resource industries Weak economies in rural communities	*Reserves*
7 Governance	Complexity of regulatory oversight Limited policy integration Conflicts over forest and rangeland management practices Coordination in research and information sharing Standardized, comprehensive information systems	

Urban

The physical concerns for forest and rangeland resources in urban areas are usually related to street trees, "green" neighborhoods, urban parks and landscapes, urban stream systems, gardens, and botanical reserves. Wood and wood waste recycling and composting are also importsnt resource issues. Urban areas are the primary end users of natural resource products. Water conservation, reduced consumption, and recycling are all examples of strategies to reduce demands on natural resources.

Management concerns include reduction of fuel hazards where wildfire is a concern, flood control, planting and maintenance of street trees and landscapes, pest control, stream restoration, preservation of old trees, provision of additional urban "green" space and recreational opportunities, and promoting wood recycling programs and technologies.

Metropolitan forests and rangelands near Mount Diablo.

Metropolitan Forests and Rangelands

One other category has been developed in the Assessment to account for the unique importance of lands near urban areas. Metropolitan forests and rangelands refer to the forests and rangelands within the urban area and its six-mile surrounding buffer. This region contains a wide variety of Management Landscape classes. Primary public concerns in metropolitan forests relate to lifestyle amenities such as open space, regional parks, protection of landscapes, and provision of outdoor recreation. Public safety issues such as downstream flooding and protection from wildfire are also critical. Commodity production such as grazing or timber management continues on a constrained basis with higher costs than in more rural areas. Impacts of management on water supplies, traffic, and noise are of concernin some places. Watershed and habitat protection typically receive increased management attention. Heightened public interest and values in metropolitan forests and rangelands can create the paradox of greater economic pressure to convert to more intensive land uses.

Key challenges in metropolitan forests and rangelands will relate to the provision and management of open space, protection from flooding and fires, management of regional park watersheds and vegetation, and pest control. Resolving issues between neighbors and landowners that continue to produce commodities will remain an important challenge.

Agriculture

The agriculture classification refers to areas that are devoted to irrigated agriculture and are not forests and rangelands. This includes intensive agriculture such as row crops, vineyards, orchards, and irrigated pasture. It is significant to forest and rangeland policies for a number of reasons. First, while these lands have historically absorbed much of the development pressure, a growing proportion of development will occur on rangelands in the coming decades. Second, a significant source of loss of rangelands has been conversion to agricultural uses such as vineyards while the conversion of forests to rangelands has decreased. And third, irrigated pasture plays a significant role in feed for beef cattle and other livestock that also use rangelands.

Policy concerns in this class relate to the fiscal stability of farms with range and forest components, the conversion of rangeland to development, and the habitat impacts of expanding irrigated agriculture into forests and woodlands. Another secondary concern is that livestock disease that starts in dairy herds can spread to beef cattle, so continued attention is necessary to overall livestock health programs.

Development pressure on coast live oak groves, Arroyo Grande. Photo by Roland Muschenetz..

Rural Residential

Roughly half of the eight million acres of California used for residential or commercial purposes has less than one structure per acre. These low density, or rural residential, areas maintain considerably more of the natural vegetation than urban or suburban development but still fragment the landscape with structures, roads, and active use. These uses often diminish the value of the lands for many animal and plant species sensitive to human activities. The motivations driving the conversion of land to low density residential use include the new resident's desire to live away from more densely populated urban areas, a rural lifestyle, a chance for a part-time "hobby" farm, more solitude, and open space. To individual property owners the transformation is beneficial to them even if it may reduce value related to the previously less fragmented forests or rangelands.

Commodity production such as timber harvesting and grazing often continues on a limited basis compared to less fragmented areas. In addition to the values appreciated by the owners these lands also provide considerable open space and recreational values to non-owners who live nearby or visit the areas. Conflicts over management activities that affect water supplies, visual aesthetics, traffic, and noise are typically higher in rural residential areas than in less fragmented areas. The importance of adequate infrastructure to protect public safety and provide emergency services also increase.

Some of the most serious challenges in recent years are related to the increasing number of homes in the wildland urban interface at significant risk from wildfire. In many areas pests and diseases such as eucalyptus borer, bark beetle, and sudden oak death are increasing the number of dead trees and increasing wildfire risks. The design and implementation of socially appropriate resource management activities to reduce fire risk are generating concerns that both too little and too much is being undertaken.

Working/Private

Working/Private landscapes are those lands in private ownership with sparse housing density (less than one unit per 20 acres). They are used for a variety of purposes with commodity production often as the primary focus. These areas, where the role of private investment for production of energy, lumber, and livestock is coupled with supportive policy tools can potentially play the biggest role in maintaining lands in an unfragmented condition. In addition, these areas still provide for habitat restoration or management, recreation, and dispersed living space. These areas provide significant traditional ecosystem services as complements to the primary revenue producing management goals. A number of these lands, especially near urban areas or key ecological resources, could be protected directly from residential development through various types of easements.

Management concerns in these areas vary. Larger ranchers and timber growers face limited profitability and a variety of production constraints. Smaller landowners with significant portions of the private forest and rangeland resources have more diverse objectives and have fewer management resources to deal with increasingly complex challenges. Wildfire remains a threat to landowners, as do some pests and exotics. In some locations, downstream flooding is an important issue to residents.

Communities reliant on these lands also have experienced decline in the number of jobs based on resource-based industries. The overall economic base has diversified in most areas and the social well being in rural areas tends to be good. However, a number of the more rural communities face difficulties in their ability to provide jobs, programs, and infrastructure.

Perhaps more than any other category, the largest number of issues outlined by the Assessment will apply to the Working/Private class. This is because the land area is so large, more closely tied to commodity production, and often receiving limited attention from local government.

Working/Public

The Working/Public landscapes are those lands in public ownership with sparse housing density. For the most part, these are federally owned and managed more for ecosystem restoration and services, recreation, and habitat than are comparable private lands. Commodity production is still significant, especially on the most productive lands. Furthermore, by the nature of their public ownership, most of these lands are protected from conversion from development.

The focus of issues on these lands relates in part to location and in part to the category of concern. For example, day-use recreation is paramount in southern California where four national forests are within easy driving distance of millions of people. Conversely, concerns over protecting endangered species and old growth forests are relevant to California and citizens across the United States.

Past management legacies, wildfire, exotics, and pests are ongoing concerns to public forest and rangeland managers. Reducing fire hazard near communities is a focus of the recent National Fire Plan. These efforts are likely to expand. Public agencies continue to restore watersheds and habitat with budget restrictions. Public conflict will most probably continue over the goods and services produced from public lands.

Reserves

Reserves are permanently protected from conversion of natural land cover and have mandated management plans in operation to maintain ecological processes or a primarily natural state. They are often established through acts of legislation and examples include national parks, federal and state wilderness areas, and the University of California Natural Reserve System. State parks also often have reserve functions in addition to their recreational uses. Lands are acquired through a variety of funding sources— federal, state, joint federal-state, local funding, and non-profit conservancies. Conservancies are a small but growing part of California's strategy to acquire and manage key land resources either in full or through limited purpose easements.

Selective additions to the Reserve system may be necessary to protect wildlife and fish habitat, scenic vistas, and unique habitats. Policy questions relate to how this can be accomplished with limited funding and how differences in opinion can be resolved about the size of reserve systems necessary for the habitats or ecosystem types in most in need of protection.

Tools for the Working Landscape

A wide variety of tools are available in the policy tool box to address the challenges on forests and rangelands. In many cases, more than one tool can be used. While not exhaustive, examples are suggested for each policy challenge for lands in the Working Landscape (Figure 94). Still further detail is possible, such as focusing issues on specific categories of the landscape or geographic locations like bioregions, counties, or watersheds. However, since the possibilities are nearly unlimited, additional details await guidance from the California State Board of Forestry and Fire Protection.

Figure 94. Tool box for the Working Landscape

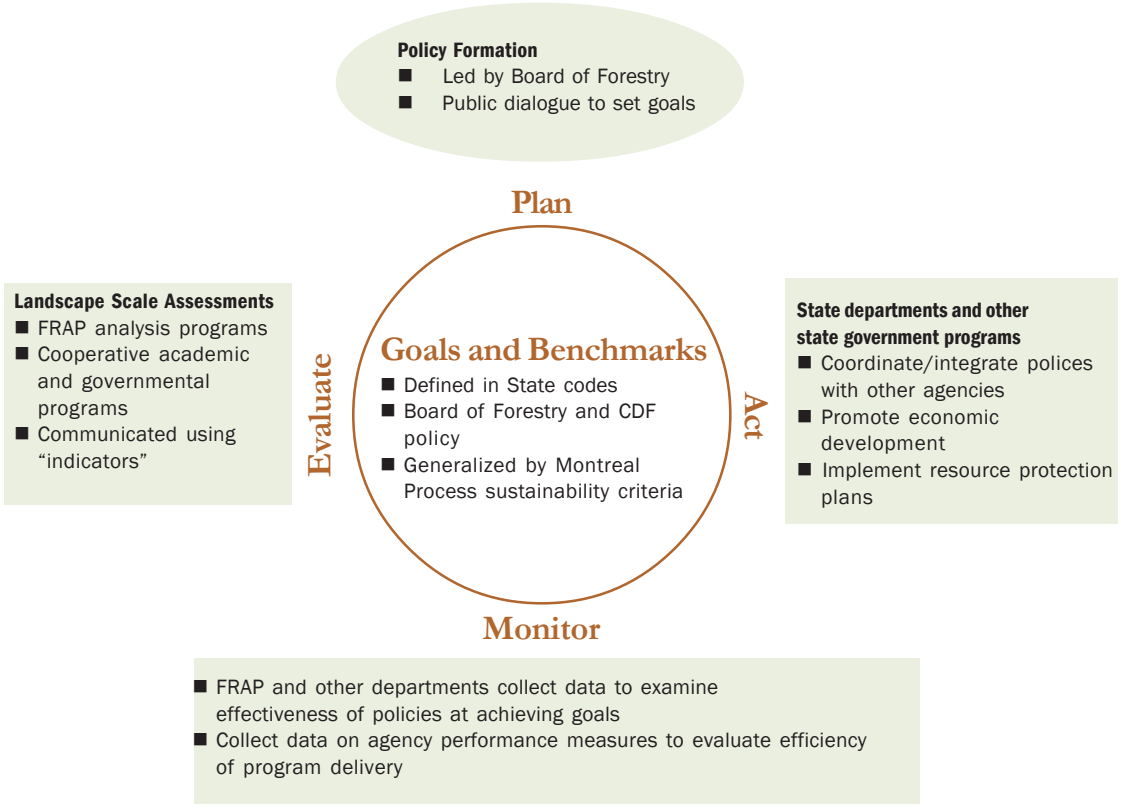
Detailed Policy Goals and Benchmarks, Challenges, and Options

The process used in this Assessment leading to development of forest policy incorporates the Continuous Improvement Cycle concept, a fundamental part of total quality management (Evans and Lindsey, 1996). The basic premise is that by measuring conditions and comparing them to benchmarks, deficiencies can be identified and new policies can be developed to improve conditions.

To some extent, FRAP has completed two parts of the cycle. It has collected information (**Monitor**) and used indicators to measure (**Evaluate**) the status and trends of forest and range conditions important to sustainability (Figure 95). The next parts of the cycle are to compare the findings to current goals (**Benchmarks**) and adapt policy to respond to conditions (**Plan**). The final part is to implement new policy (**Act**), including the use of adaptive management plans that focus on experimental actions while closely monitoring results.

After reviewing the findings of the suite of indicators, several observations can be made regarding the most prominent challenges facing California's forest and rangeland resources. These challenges were identified in part by comparing the status and trends findings to goals established in state law or policy, or by the Montréal Process Criteria themselves. The intent of comparing forest and rangeland resource status to goals and sustainability criteria is to help identify the most obvious conditions that deviate from established benchmarks. This provides the opportunity to bring forward the most pressing challenges and begin the discussion on changes needed to existing policies and programs to help correct undesirable conditions and trends. Complete discussion of the most prominent policy challenges follows.

Figure 95. Using the Continuous Improvement Cycle in the 2003 FRAP Assessment



Adapted from the Oregon Department to Forestry " Changes in the 2003 Forestry Program for Oregon"

Biological Diversity

Goals and Benchmarks

- Conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat (California Fish and Game Code, Section 2050).
- Protect and preserve all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants and their habitats, threatened with extinction, or those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation (California Fish and Game Commission Policy on Endangered and Threatened species).
- Encourage the preservation, conservation, and maintenance of wildlife resources…to maintain sufficient populations of all species of wildlife and the habitat necessary to achieve beneficial use and enjoyment of wildlife, intrinsic, and ecological values, and to provide for economic contributions to the citizens (California Fish and Game Code, Section 1801–1802).
- Protect forest lands and aquatic resources by focusing on protection of wildlife habitat, rare plants, and biodiversity; maintenance of habitat connectivity and related values; protection of riparian habitats, oak woodlands, ecological old growth forests, and other key forest types and seral stages that are poorly represented across landscapes and regions {that} support biodiversity and maintenance and restoration of natural ecosystem functions (California Public Resources Code, Section 12210, California Forest Legacy Program Act of 2000).
- The hardwood resources of California should be managed for the long-term perpetuation of their local and broader geographic representation and to continue to provide for their inherent natural and biological values and processes. These values and processes may include, but are not limited to, regeneration, plant species composition, vegetation structure and age class distribution, water quality, and other biotic and abiotic resources (California Board of Forestry and Fire Protection Joint Policy on Hardwoods).
- Acquire and restore to the highest possible level, and maintain in a state of high productivity, those areas that can be most successfully used to sustain wildlife, and which will provide adequate and suitable recreation (California Fish and Game Code Section 1301, Wildlife Conservation Law of 1947).

Policy Challenges

Wildlife habitat structure gaps

California retains over 85 percent of its presettlement era natural landscapes. While expansive natural areas are still intact, some habitats have diminished by over 60 percent in some regions.

California has a wide variety of forest structures. However, uncertainty remains over the amount and arrangement of successional stage structure and special habitat elements required to sustain diversity. Several unique habitats, such as low elevation riparian forests, are at a small percentage of their original distribution. Old growth forests have limited current total extent (14 percent of all conifer forests) compared to higher levels that existed centuries ago. Current structural profiles indicate extensive dense forest structures with areas of large trees abundant (31 percent of conifer forest land). These dense forests are capable of both providing some of the attributes of old growth forests in the near term as well as the ability to grow into old growth forests in the long term.

One of the greatest concerns about the conservation of biological diversity on forests and rangelands is low density housing, called parcelization. This currently affects 3.2 percent of forests and rangelands and will expand over time. These lands are at high risk to additional development, further altering habitats and possibly degrad-

ing resources. Several bioregions have substantially higher levels of parcelization with the highest current levels in the South Coast and Sacramento Valley bioregions, affecting more than 10 percent of forests and rangelands. All regions, however, still have significant areas in Working landscapes.

Decline in some native species

Regulatory listings of threatened and endangered species are continuing to rise, particularly in plant and fish species. While population numbers of many species are stable, some large mammal species, bird species, and amphibians considered common in forested habitats are showing decreasingly stable populations.

Using all landscapes to meet biological diversity goals

Management patterns of forests and rangelands include 23 percent in Reserve status, where management objectives are oriented towards ecological protection and other non-consumptive recreation values. The remaining 77 percent are in the Working status, lands managed for wide range of ecological and commodity uses. Specific habitats with low areal extents and at risk from land use impacts are of particular concern

High public costs of acquisitions and high private costs of use restrictions impede development of effective reserve scenarios; uncertainty of how to assess value of working landscape increases uncertainty for sustainable management. The Working landscape is expected to supply increased ecosystem services at expense of production and profitability.

The high public cost of new acquisitions and the high private cost of new uncompensated use restrictions limit the cost-effectiveness of many current approaches. More innovative and equitable approaches to promote the positive role of the Working landscapes in providing ecosystem services are necessary.

Policy Options

Policy options for wildlife habitat structure gaps

- Provide incentives for creation of open canopy and late seral stage habitat on non-federal lands.
- Strengthen analysis of cumulative impacts of land uses on terrestrial habitat.
- Improve mapping and monitoring technologies and systems.
- Strengthen collaboration between regulatory agencies, and public industry in addressing wildlife habitat concerns.
- Use long-term plans for larger scale analysis and monitoring schemes.
- Expand and focus use of conservation easements and incentives.
- Develop focused research program on State Forests for wildlife habitat.

Policy options for decline in some native species

- Continue to develop HCPs, NCCPs, or other long-term plans that provide for landscape level analysis, protection, and resource use.
- Develop additional reimbursement mechanisms that preserve habitat.

Policy options for using all landscapes to meet biological diversity goals

- Recognize the continuing importance of ecosystem services from the Working landscape and support innovations in approaches.

Productive Capacity

2 Goals and Benchmarks

- Achieve Maximum Sustainable Production while maintaining other values (Z'Berg-Nejedly Forest Practice Act).
- Maintain prime timberland; promote establishment of growing stock; balance of timber size classes; diversity of quality characteristics; more efficient utilization (California State Board of Forestry and Fire Protection Handbook, Chapter 0334).
- Insure that a cover of trees of commercial species, sufficient to utilize adequately the suitable and available growing space, is maintained or established after timber operations (California Public Resources Code, Section 4561–4563.5, Z'Berg-Nejedly Forest Practice Act).
- Improvement of brush covered lands through site selection, clearing, and revegetation (California State Board of Forestry and Fire Protection Handbook, Chapter 0335).
- Encourage use of range improvements designed to enhance fire hazard reduction, stabilization of soil, water conservation, and betterment of game habitat (California State Board of Forestry and Fire Protection Handbook, Chapter 0335).

2 Policy Challenges

Declining land base and administrative withdrawls of land available for timber production

California has 7.3 million acres of private timberland, of which 5.4 million acres are classified into the Timberland Production Zone (TPZ). Larger TPZ owners form the category most likely to grow and harvest timber on a continuing basis. Smaller owners are much more varied and many hold timberlands for non-timber growing reasons. Increased planning requirements, operational limitations, and habitat protection have all increased the expense of timber growing on private land, potentially making conversion a more viable option.

The private land base capable and available for timber production (timberlands) is slowly declining due to conversions to non-timber uses such as housing, agriculture, and roads. Approximately 76,000 acres have been converted between 1984 and 1994. In addition, over 170,000 acres have been statutorily withdrawn (devoted to wilderness, parks, and monuments) between 1984 and 1994.

From a statewide perspective a much greater area of timberland has become "unsuitable" due to federal managment plan designations that substantially limit timber production on their 10 million acres.

Risks and impacts from increased forest stocking levels

Private timberland growing stock volume has increased by 16 percent between 1977 and 1997, following a period of decline between 1950 and 1977. Periodic growth of trees on private timberlands now far exceeds harvest levels. Harvests been 64 percent of growth between 1984 and 1994, indicating increasing inventories and sustainable levels of resource use. Private harvest levels for the 2000–2002 period have continued to decline compared to the 1984–1994 period. Growth now far exceeds harvest levels across all ownerships, especially on federal lands. In some areas, this pattern has led to an increasing inventory of unutilized timber and dense forest stands. In addition to the unrealized opportunity to

sustainable generation of wood products for society, overstocked forests can have increases in pests susceptiblity and fire risk as well as loss of biological diversity values for species dependent on open, less dense forest settings.

Declining Rangeland Base

One factor affecting the productive capacity of rangelands is the declining rangeland base. This results both in less land available for grazing and reduction in other ecosystems services derived from rangelands. Such factors as conversion of lands to other uses, parcelization of larger lands into smaller lots associated with rural residential development, administrative withdrawals, management plans directing use away form riparian areas, and decreased grazing allotments on public land, all contribute to a limitation of the land base available for grazing.

Approximately three-quarters of a million acres of non-federal rangeland have been converted to other uses between 1982 and 1997 (NRCS, 2000), with projection of an additional two million of rangeland development by 2040, primarily in the Sierra foothills and southern California. Millions more have been administratively withdrawn on public lands, and grazing permit issuance on public lands continues to decline. Additionally, in some bioregions, over 10 percent of rangelands are parcelized with rural residential housing further constraining use and indicating possible denser development to follow.

Ecological limitations to rangeland use

Productive capacity of lands to support grazing, wildlife, and related uses has been degraded by several factors. These include exotic species invasion, changes in ecological functions such as wildfire cycles and climate alteration, introduction of diseases that threaten livestock, and non-sustainable types of grazing pactices. The spread or colonization of exotic plant species outside their historic distribution is an indicator of rangeland health and trends in productivity. Successfully established invasive exotics often expand rapidly due to lack of natural controls. Because they displace native species and alter ecosystem functions, the occurrence of exotics in California rangelands has significant ecological and economic consequences affecting productive rangeland management.

A significant example of the limitations on ecological conditions is the introduction of cheatgrass (*Bromus tectorum*) in much of the sagebrush steppe of northeastern California. This has reduced the perennial grass component and altered the influence of fire on shrub species. Another illustration is the expansion of the conifer woodlands into grasslands of northern California caused by fire exclusion, overgrazing of livestock, and wetter climatic conditions. A third example is the decline of aspen stands throughout the Sierra bioregion due to the lack of fire and other disturbances which foster aspen propagation and establishment.

2 Policy Options

- Consider alternative land trust arrangements that retain the productive capacity of forests and prevent either conversion to non-timber uses or full administrative/regulatory exclusion from timber management.
- Increase active management in forest stands at highest risk due to increased stocking levels. Prioriization of management activities can coincide with meeting other objectives such as fire reduction near urban areas or adaptation of stands to meet biological diversity needs.

Forest Health

3 Goals and Benchmarks

Land Management Activities

- Enhance productive capacity of soils, stock and increase growth of young stands, fully use mature stands and mortality from young stands, and encourage efficient harvesting and processing of wood products (California State Board of Forestry and Fire Protection Handbook, Chapter 0334).

- When producing socially desirable commodities and services, assess impacts and consider alternatives (California Public Resource Code, Section 21050).

Land Development

- Maintain optimum amount of timberland (California Timberland Productivity Act of 1982).
- Discourage urban expansion into timberland and conversion (California Timberland Productivity Act of 1982).
- Timber operation shall not be restricted due to lands use changes (California Timberland Productivity Act of 1982).
- …protect California's land resource, to insure its preservation and use in ways which are economically and socially desirable in an attempt to improve the quality of life in California (Government Code Section 65030, Declaration of State Policy and Legislative Intent for the Environmental Goals and Policy Report).
- Support and encourage voluntary, long-term private stewardship and conservation of California's oak woodlands to promote biologically functional oak woodlands over time and protection of oak trees providing superior wildlife values on private lands (California Fish and Game Code Section 1362, Oak Woodlands Conservation Act).

Wildfire

- Create unit operation fire control plans that make direct immediate and aggressive continuing attacks on all unwanted fires in or threatening state responsibility areas (SRA) (California State Board of Forestry and Fire Protection policy memos and CDF Handbook, Chapter 0340).
- Implement environmental modifications as the most effective means for reducing conflagration by applying fuels reduction and fire defense improvements in land use planning (California State Board of Forestry and Fire Protection policy memos and CDF Handbook, Chapter 0340).
- …classify lands within SRA in accordance with the severity of fire hazard present for the purpose of identifying measures to be taken to retard the rate of spreading and to reduce the potential intensity of uncontrolled fires that threaten to destroy resources, life, or property (California Public Resources Code Section 4201, Article 9. Fire Hazard Severity Zones).

Pests and Disease

- Maintain forest resources from damage from wildfire and natural enemies (California State Board of Forestry and Fire Protection policy memos and CDF Handbook, Chapter 0352).
- Promote health and vigorous conditions to minimize losses from pests; provide advice to assist landowners on manipulation of forest competition (California State Board of Forestry and Fire Protection policy memos and CDF Handbook, Chapter 0352).
- Obtain expeditious control of potentially devastating pests. (California State Board of Forestry and Fire Protection policy memos and CDF Handbook, Chapter 0352).
- Expand the current efforts to slow the spread of sudden oak death (Public Resources Code, Section 4750.1).

Exotic and Invasive Species

- Control the introduction and spread of exotic plant and animal species (California Fish and Game Code, Section 2116 to 2160).
- Ensure that the potential effects of introductions (of exotic species) will not have unacceptable negative impacts on native species, agriculture interests, and public health and safety (California Fish and Game Commission policy on Endangered and Threatened Species).
- The destructive impact of invasive and often poisonous noxious weeds is profound, affecting California's cropland, rangeland, forests, parks, and wildlands. Control programs' goals for noxious shall include, increasing the profitability and value of cropland and rangeland; decreasing the costs of roadside, park, and

waterway maintenance; reducing the fire hazard and fire control costs in the state; protecting the biodiversity of native ecosystems; maintaining the recreational and aesthetic value of open space, recreational, and public areas (Food and Agricultural Code Sections 7270 and 7272.5).

Air Pollution

- Promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State (Mission of the California Air Resources Board).
- Coordinate efforts to attain and maintain ambient air quality standards, to conduct research into the causes of and solution to air pollution, and to systematically attack the serious problems (California Health and Safety Code, Section 39003).
- Control and eliminate air pollutants for the protection and preservation of the public health and well being, and for the prevention of irritation to the senses, interference with visibility, and damage to vegetation and property (California Health and Safety Code, Section 43000).

3 Policy Challenges

Land Management Activities

Managing forest structure for productivity, habitats, and forest health goals

Forest structure is the major determinant of productivity, habitats and forest health. Outside of national parks and wilderness areas, the majority of California's forests have been managed for decades explicitly for commodity production with very effective fire suppression. Forests within national parks and wildnerness areas have also been affected by fire suppression. Forest management through the manipulation of stand structure, regeneration, and forest fuels (especially surface fuels) will need to integrate the multiple goals of long term forest productivity, the provision of diverse wildlife habitats, and the promotion of forest health.

Management of metropolitan forests and rangelands

Metropolitan forests and rangelands, the six-mile interface of forest and rangelands and urban areas, are the most viewed forest and rangeland landscapes in the state. The mix of land uses near metropolitan and denser rural areas provides both limits and opportunities for forest management. Major risks to loss of habitat are from fire, pests, and development. While commodity production may be limited, there is significant production of ecosystem services. Because of the often-intensive public uses near these areas, issues include potential risks for soil loss and water quality degradation, a high variety of uses, the reduction of open space, and damage from wildfire, and pests, and public safety. Working/Private forests and rangelands represent a large component of these areas. The long-term continuation of social amenities within metropolitan forests depends on the economic feasibility of continued commodity-based land management in Working/Private forests and rangelands.

Public understanding of management practices

Management activities, such as logging, grazing, and water withdrawals can diminish ecological values due to simplification of habitats and impacts on water quality. This is true whether it occurs in a specific place, anywhere in California, or another state or country. The same forests and rangelands where natural resource management occurs also provide considerable ecological and social values that could be totally lost if converted to intensive urban or agricultural uses.

Forest management as a tool to meet economic and social values will continue to raise public concerns especially when it occurs near communities with limited exposure to resource management. In many cases, some degree of forest managment will often be the most effective tool to achieve goals such as fire risk reduction, willife habitat improvments,m or control of invasive species.

Land Development

Forest and rangeland conversions

Development is a significant driver to loss and degradation of native habitat. This impact is likely to come from outright loss of natural land cover to urbanization and degradation of continuity and structures through increases in low housing density (parcelization). Other impacts related to development include reduced water quality and loss of open space that contributes to quality of life.

Over the past 15 years, 933,000 acres of non-federal forests and rangelands have been converted to urban or other uses (NRCS, 2000). Over the next 40 years, approximately 10 percent of the current forest and rangeland base (2.6 million acres) are projected to be impacted by development (high density urbanization and low density parcelization). This loss is similar to the past 15 years and over this period will exceed projected loss to agricultural lands.

Certain forest and rangeland habitats may be more affected by development. Hardwood Woodlands, Shrub, and Desert land cover types are likely to be most impacted. The South Coast, Sierra, and Mojave bioregions are projected to have the greatest extents and percentages of the land base affected.

Impacts to losses of forests and rangelands affect the full spectrum of sustainability criteria. Ecosystem services such as maintenance of biological diversity and soil and water quality are impacted via habitat loss, simplification, fragmentation, and loss of water-related ecosystem services. Productive capacity impacts relate to loss land base from which to socio-economic commodities. Well being impacts include localized economic impacts, loss of open space, and export of environmental damages to commodity producing regions outside the State.

Wildfire

Fuels buildup risks to ecosystems and human assets

Wildfire and prescribed fire (purposely set fire) has a dual role in California. Wildfire can destroy valuable resources and property and degrade our quality of life through smoke and negative visual impacts. On the other hand, it provides an essential ecological function by cycling nutrients, modifying habitat for wildlife, and increasing forest health by decreasing woody material making forests less susceptible to pest, disease, drought, and pollutant stresses.

With current levels of fire at a fraction of the amount of the presettlement era, the nature of fire has also changed to one of less frequent, more intense fires.

The combination of successful suppression efforts, limited prescribed fire, and some management legacies have led to high levels of fire threat to many natural and human assets. It is currently estimated that 48 percent of the State has vegetative conditions promoting Very high or Extreme fire threats.

Several ecosystems are at high risk to intense fire resulting in destabilizattiopn of biological diversity and ecological functions such as water cycling and soil productivity. Most forest and rangeland bioregions have 60 to 80 percent of their natural vegetation at high risk to ecological damage from wildfire.

Human health, quality of life, and human assets (houses and property) are also at risk from wildfire. Over 7.8 million acres are in the wildland urban interface (WUI), including nearly 3.2 million homes that are highly threatened by wildfire. The Sierra bioregion has the most area of WUI at significant risk and the South Coast bioregion has the most homes threatened.

Pests and Disease

Elevated pest damage and risk related to high forest stocking levels

Pests and diseases are natural processes when operating in normal historical ranges or low levels. They perform necessary roles in ecosystem processes such as pollination, nutrient cycling, and thinning of overstocked forests. Elevated levels of pests and diseases create economic losses to timber, reduce aesthetic qualities, and can affect biological diversity by shifting structures and composition that favor one species over another.

Peak levels of mortality from insects to conifer forests have declined since the early 1990s where five to 10 percent of many forest stands were destroyed. Low levels of mortality are typically less than one percent damage per year in forested areas. Recent combinations of drought stresses and vegetation stocking and decadence have resulted in very high levels of mortality,

often over 50 percent in the San Bernardino and Peninsular ranges of southern California.

Management actions have an important affect on future levels of pest damage. Of particular concern is where overstocked forest lands make trees less vigorous and susceptible to drought and insect damage. In the next 15 years, over 15 percent of the conifer forest in the State are at risk to pest damage due to overstocking. Some bioregions, including the Modoc and South Coast, have approximately 25 percent of the conifer forest at risk.

Emerging pest and disease threats to unique habitats and livestock health

Emerging pest concerns involve introduction of new, often exotic pest that have potential for impacting biological diversity by destroying unique host habitat. These pests and diseases include sudden oak death (SOD), which affects coast oak woodland habitat in the Bay Area/Delta bioregion, eucalyptus borer which is prevalent in the urban South Coast bioregions, and Pitch canker, which affects closed cone pine habitats of the Bay Area/Delta and Central Coast bioregions.

Exotic and Invasive Species

Impacts of exotic and invasive species to biological diversity and rangeland productivity

Invasive non-native species alter ecosystem structure, composition, and processes and out-compete and exclude native plants and animals. Effects also include changing ecosystem function by changing disturbance regimes such as frequency and intensity of fire, altering hydrologic cycles, and increasing soil erosion rates.

Invasive species also have a considerable effect on the productive capacity of forests and rangelands through diminished production or increased costs for control. Economic impacts to range resources include reduced forage production and increased road maintenance costs.

Over 76 non-native invasive plants are found to have impacts on forest and rangeland resources in California. 42 of these are of greatest concern because of their ability to aggressively spread and cause higher levels of impact to biological diversity. Regional presence of non-native invasive plants show high numbers of the most detrimental species are found in the Bay Area/Delta, South Coast, Central Coast, and Klamath/North Coast bioregions.

Non-native animal species are of major concern to biological diversity. Overall, approximately 14 percent of California's animal species (terrestrial and aquatic vertebrate) are established non-natives. Introduction of non-native fish species is considered one of the three main reasons (habitat change and over-fishing being the other two) for the endangerment or extinction of what once were some of the most abundant native fish species in aboriginal California. Introduced fish make up 53 of California's 120 freshwater species.

Increasing air pollution in several regions

Air pollutants are readily generated and transported to forests and rangelands throughout many air basins. Recent trends suggest high levels of air pollutants are likely to continue in several air basins in the southern and eastern portions of California where urban activity, transportation, and agricultural pollution sources generates waste that is transported via westerly wind flows.

Regions of most concern for air pollution impacts are those that most recently have shown trends toward increasing levels of air pollution. These include the San Joaquin, Sacramento, and southern portions of the Mountain Counties' air basins.

Ozone, combined with other stressors such as drought, makes forest resources more vulnerable to disease, fire, and pests. The southern Sierra Nevada mountain forests are very susceptible and have a considerable amount of affected areas. Ozone damage to forests and woodlands reduces growth and can increase tree mortality.

3 Policy Options

Land Management Activities

- Maintain support for urban forestry and stream restoration programs.
- Enhance cooperation between agencies and groups with an interest in metropolitan forests.
- Retain strong fuel reduction, fire protection, and pest control programs.
- Improve reporting of activities, such as acquisition of open space, to a statewide database.
- Enhance curriculum focus on metropolitan forest issues in forestry schools.
- Focus on achieving agreement on desired landscape goals and then address potential practices and conflicts.
- Learn from experiences of The Nature Conservancy, other non-profits, and regional parks on how to explain management needs.
- Review role of environmental certification in providing for broader acceptance of management tools.
- Provide for public input into decision making and monitoring.
- Strengthen skills of resource professionals regarding public involvement and public values.
- Continue strong support for focused management practices, such as fuel reduction and control of exotics and pests.

Land Development

- Maintain tax-related zoning.
- Focus part of local general plans and related project design on integration and protection of productive areas.
- Increase use of easements and land banks.
- Anticipate growth areas and focus them away from the most productive forests and rangelands.

Wildfire

- Maintain support for Fire Safe Councils.
- Expand support for biomass industry based on its public values such as reduction of fuels and forest wastes.
- Strengthen fuel breaks and other fuel related parts of project design in land use plans.
- Increase funding for pre-fire projects.
- Develop arrangements for long-term fuel supplies from federal lands.
- Maintain research funding for utilization of small logs, biofuels, etc.
- Continue to work with California Air Resources Board regions to meet air quality standards and maintain sufficient burn days.
- Streamline environmental review processes related to fuel reduction.
- Balance investment priorities between areas with many acres of significant fire threat (Sierra and Modoc) with regions of few acres but many houses threatened.
- Substantial investment will be required to reintroduce fire into the forests and rangelands to manage threats to ecosystems and people. These investments include information systems to support planning and decisions, site specific and regional project planning, implementation of burning operations, and implementation of mechanical vegetation operations aimed at reducing hazardous fuel build up.

Pests and Disease

- Maintain and improve early detection capability.
- Develop overall plan to guide forest and rangeland pest research and control, including public involvement.
- Expand research on control methods.
- Maintain California Department of Food and Agriculture quarantine capacity.
- Enhance support for County Agricultural Commissioners, University of California researchers, and landowner participation.

Exotic and Invasive Species

- Strengthen support for California Department of Food and Agriculture program on prevention, eradication, and education.
- Focus on the development of control methods, both chemical and non-chemical.
- Enhance support for county Agricultural Commissioners, University of California researchers, and landowner participation.
- Promote efficient and effective control programs and strategies characterized by efforts that prevent invasions and quickly detect new occurrences so that the species may be removed or contained before spreading.

Air Pollution

- Continue to work with California Air Resource Boards and local Air Pollution Control Districts to address concerns over use of prescribed fire and particulate matter from forest and rangeland management activities.
- Maintain periodic assessments of impacts of ozone and other pollutants on forest and rangeland vegetation and aquatic resources.
- Develop improved modeling of air quality impacts of wild and prescribed fire.
- Promote development of fuel reduction and forest management alternatives that minimize use of fire and production of air contaminants.

Soil Conservation and Water Quality

4 Goals and Benchmarks

- Ensure that soil erosion associated with timber operations is adequately controlled to protect soil resources, forest productivity, and water quality (Z'Berg-Nejedly Forest Practice Act, Article 5, 4562.5).
- Ensure the protection of beneficial uses that are derived from the physical form, water quality, and biological capability of streams (Z'Berg-Nejedly Forest Practice Act, Article 5, 4562.7).
- Protect forest lands and aquatic resources by focusing on protection of water quality, fisheries, and water supplies (California Public Resources Code, Section 4111).
- Controllable water quality factors shall conform to the water quality objectives contained herein. When other factors result in the degradation of water quality beyond the levels or limits established herein as water quality objectives, then controllable factors shall not cause further degradation of water quality. Controllable water quality factors are those actions, conditions, or circumstances resulting from man's activities that may influence the quality of waters of the State and that may reasonably be controlled (State Anti-Degradation Policy, Basin Plan, Chapter 3, Water Quality Objectives).
- Recover harvestable steelhead and salmon populations, restore watersheds, and so contribute to building healthy communities (Board of Forestry and Fire Protection and Fish and Game Commission Joint Policy on Pacific Salmon and Anadromous Trout).
- Quantity and quality of the waters of this state should be apportioned and maintained respectively so as to produce and sustain maximum numbers of fish and wildlife (California Fish and Game Commission policy on Endangered and Threatened Species).
- Activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible (California Water Code, Section 13000–13002).

4 Policy Challenges

Measuring cumulative watershed impacts

Continuing efforts to increase watershed information and understanding of watershed processes are necessary to facilitate improvements in watershed conditions and protect soil and water resource values. Comprehensive watershed assessments must also provide information necessary for determining water quality conditions and the causes of any water quality and beneficial use impairments.

While there is broad agreement on the importance of linkages between management practices, soil conditions, channel conditions, and cumulative watershed effects, a consensus is lacking on how to measure, monitor, or evaluate effects. Much of the difficulty relates to the episodic and random nature of the events that can drive major negative changes in watershed conditions. Most past and recent studies indicate that unpaved roads are the primary human-caused source of sediment. The environmental significance of these or any other sources of change depends on complex interactions between new changes, background conditions, and ongoing rates of recovery or degradation.

Improving watershed condition and restoring fish habitat

Forest and rangeland watersheds typically provide high water quality runoff compared to other land uses. However, many watersheds have legacy impacts of historic land uses, ongoing land use changes, and episodic, intense wildfires that have degraded water quality and aquatic habitat conditions. In-stream habitat quality, including water quality and quantity, is a critical factor in anadromous salmonid population levels. A combination of in-stream habitat conditions and other environmental influences have contributed to a long-term downward trend in populations of specific salmon stocks. This is reflected in the listing of salmonid stocks under state and federal endangered species acts.

Watershed management and restoration—including sustainable resource management, retention of in-stream water levels for aquatic species, protection of watershed values key to maintaining water quality and aquatic habitat, and implementation of fish habitat restoration projects—have emerged as important and complex issues in forest and rangeland management. Landowners have been taking steps to improve watershed conditions and aquatic habitat by improving their management practices and implementing restoration projects. In degraded watersheds, improving water quality, and aquatic habitat requires identifying, prioritizing, and addressing current and historic land use impacts on these values.

4 Policy Options

- Continue support for watershed assessments using common watershed models and risk assessment capacity, enhancing cooperative mapping and monitoring techniques, and using long-term plans for large scale analysis and monitoring schemes.
- Continue monitoring, especially to link in-stream conditions to hillslope processes. Incorporate in-stream monitoring technologies to track effectiveness of regulations and restoration efforts.
- Increase options for long-term plans (such as Rangeland Water Quality Management Plans) by forest and range landowners and connect plans to eased regulatory process requirements at the plan level.
- Foster collaboration between regulatory agencies, the general public, and private landowners including integrating Timber Harvest Plan review and rules and Total Maximum Daily Load requirements.
- Maintain funding and increase landowner incentives for restoration projects and maintain support for urban stream restoration.
- Use the Demonstration State Forests as a venue for testing and demonstrating watershed assessment approaches and restoration techniques.
- Conduct focused research on the dynamics of fish populations and their linkages to in-stream conditions and land uses.

5 Goals and Benchmarks

- Acquire and develop data and information on global climate change for use in reducing or mitigating the production of greenhouse gases including net reductions through the management of natural forest reservoirs (California Public Resources Code Section 25730, Climate Change Inventory and Information).
- Update the inventory of greenhouse gas emissions …[and] information on relevant current and previous energy and air quality policies, activities, and greenhouse gas emissions reductions and trends since 1990 (Public Resources Code 25730, California Energy Commission).
- Global warming would impose on California … compelling and extraordinary impacts including potential reductions in the state's water supply due to changes in snow pack levels; adverse health impacts from increases in air pollution; adverse impacts upon agriculture and food production caused by projected changes in the amount and consistency of water supplies and significant increases in pestilence outbreaks; projected doubling of catastrophic wildfires due to faster and more intense burning associated with drying vegetation; and significant impacts to consumers, businesses, and the economy of the state due to increased costs of food and water, energy, insurance, and additional environmental losses and demands upon the public health infrastructure (Findings and Declarations section of AB 1493, Pavley, Chapter 200, Statutes 2002).
- …encourage voluntary actions to achieve all economically beneficial reductions of greenhouse gas emissions from California sources (Health and Safety Code 42800, California Climate Action Registry).
- The state's tradition of environmental leadership should be recognized through the establishment of a registry to provide documentation of greenhouse gas emissions levels voluntarily achieved by sources in the state. The registry will provide participants an opportunity to register greenhouse gas emissions information in a consistent format using publicly reviewed and adopted procedures and protocols (Health and Safety Code, Section 42801, California Climate Action Registry).
- To promote stable electricity prices, protect public health, improve environmental quality by ameliorating air quality problems by reducing the burning of fossil fuels, stimulate sustainable economic development, create new employment opportunities, and reduce reliance on imported fuels, … implement the California Renewables Portfolio Standard Program to attain a target of 20 percent renewable energy (California Public Utilities Code,399.11).

5 Policy Challenges

Understanding and responding to climate change

Environmental and climate change impacts on forest ecosystems are likely to include shifts in the growth and geographic range of different forest types; increases in the frequency of fire and insect outbreaks; changes in the carbon storage function of some forests (e.g., from sinks to sources); enhanced stressors (ozone, nitrogen deposition, land use change); resulting increases in public safety risks from more fire and dead trees; and potential extirpation of plant and animal species in isolated pockets or changes in their range. Increased uncertainty can limit investment and extreme events can put operators out of business increased risks to public safety from fire, flood, exotics, and disease.

California's forests and rangelands can also provide a unique role in affecting global impacts from greenhouse

gas emissions (primarily carbon dioxide, $C0_2$). Forests provide a large "sink" to sequester (capture) atmospheric $C0_2$ emitted from point and non-point pollution sources.

5 Policy Options

- Promote conservation of forest lands and vigorous stands which can significantly contribute to large-scale air pollution reduction. Maintain healthy forests which are vital to protecting resources from air borne waste impacts and which provide opportunities to contribute to pollution reduction through carbon sequestration.
- Promote forest health and conserve forest lands from land use changes by providing financial opportunities to land owners who are managing their lands in ways that positively influence carbon storage.
- Create markets for carbon and other ecosystem services to provide additional funds to landowners.
- Refine carbon sequestration accounting and carbon trading mechanisms.
- Maintain and adjust capacity and flexibility of emergency services related to natural process such as flooding, disease, and wildfire.
- Develop a contingency plan for ecological impacts of climate change, including seed banks and land trades adjusted to ranges of vegetation types.

Socio–Economic Well Being

6 Goals and Benchmarks

- Create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations (California Public Resources Code 21001 (E), Division 13. Environmental Quality, Chapter 1. Policy).
- A continued and predictable commitment of timberland and investment for growing and harvesting timber are necessary to ensure…the long-term economic viability of forest products industry and stability of local resource-based economies (California Timberland Productivity Act of 1982).
- Protect and encourage farming and ranching operations that are operated in a manner that protects and promotes healthy oak woodlands (California Fish And Game Code, Section 1362, Oak Woodlands Conservation Act).
- Encourage outdoor recreation opportunities for the citizens of California [for contribution] to a healthy physical and moral environment, [and to] contribute to the economic betterment of the state (California Public Resources Code Section 5096.72, State Beach, Park, Recreational, and Historical Facilities Bond Act of 1974).

6 Policy Challenges

Rising consumption and statewide limitations on commodity output

California's consumption of wood products, livestock products, water, and biomass continues to rise while in-state production from our forests and rangelands is declining or remaining considerably below sustainable levels of production. These trends essentially export some of the environmental impacts of renew-

able resource use practices and limit innovation towards sustainable resource management practices that also meet social needs.

More than three quarters of Californias lumber consumption and nearly all of its paper and pulp consumption is now imported from other states and foreign countries. California had already the highest percentage of its forests in parks and reserves and implemented some of the strictest standards on forest management on private lands before California's production and consumption trends substantially diverged in the 1990s.

The range livestock industry has produced a relatively stable supply of products over the past decade in spite of low wholesale prices and increasing operating costs. In addition to the population driven increases in demand, there is also an increase in the social value of the substantial ecosystem services provided by the range livestock industry through the maintenance of largely unfragmented natural vegetation, open space and recreational opportunities. However, there are signs that conversion to smaller residential parcels may accelerate around expanding metropolitan areas where many family run operations alerady face the challenge of operating within increasingly residentially dominated environments.

Water supply and use continues to be a major ecological and economic theme in California. The challenge of addressing the ecological values of water and water-dependent ecosystems and the increasing needs for urban uses will continue to challenge California. Forest and range management impacts on water runoff, surface storage, and groundwater storage are increasingly becoming part of the larger issues of water management.

California's demand for electricity will continue to grow. Based on recent legislation, an increasing portion of that demand must be met from renewable supplies such as biomass, solar, and water. Biomass material as a source of statewide power generation has remained steady over the past decade at three percent of total power generation. Substantial unutilized biomass material exists statewide, especially within public and private forests, but harvest and other cost limitations must be addressed if more forest biomass fuel is to used.

Meeting changing demands for recreation and open space

Outdoor recreational use of forests and rangelands is an important component of our overall quality of life. Public wildlands near metropolitan areas comprise only 13 percent of the statewide area, but provide over half the statewide recreational visits. Private wildlands near metropolitan areas also provide considerable recreational opportunities as well as valuable open space. High management costs and competing pressures for alternate land uses may constrain the long term recreational possibilities for both public and private lands near major population centers.

Meeting costs of resource protection

Much of the cost of providing for socially valued activities such as fire protection, control of pests and exotic plants, vegetation management after catastrophic disturbances, and resource management planning has been provided by private entities and public sector departments engaged in resource management and commodity production. As the economic viability of many of these natural resource industries and departments declines, there may be an increasing level of unmet resource protection costs that could require additional public funding.

Limited incentives for private production of ecosystem services

The current regulatory environment has limited incentives for landowners to produce the highly valued ecosystem services that are provided by forests and rangelands. Landowners are often reluctant to disclose presence of threatened and endangered species because of the fear of a land "taking" and the belief that the regulatory framework inhibits innovations and may limit investment in restoration activities due to uncertainyy of outcomes.

Land use restrictions designed to enhance ecosystem services will also reduce traditional employment and revenue production that may or may not be compensated by other on-site or off-site employment and revenue production. This may lead to lower overall provision of ecosystem services.

Maintaining large landholdings in resource industries

Economic and regulatory uncertainty may drive some large forest products industries and large ranches to consider discontinuing some of their operations and selling holdings for residential or recreational uses. This could have consequences such as a reduction of species dependent on unfragmented landscapes; less long term investment in range resources, tree planting, road system improvements, and stream restoration projects; and less management of dangerous fuel levels. The loss of major economic operations could also have significant negative impacts on local employment and economic activity.

Weak economies rural communities

Compared to the State as a whole, income levels are lower and unemployment rates are higher in most forest and rangeland counties. While forest and rangeland commodity products such as timber and livestock are a significant part of some regional economies, total values of these products is a small component of the statewide Gross State Product. As total output drops, many of the remaining employment is consolidating and shifting closer to metropolitan areas.

Losses of the human and infrastructure resources as a result of the reduced natural resource economic contributions is likely to be a fall-out of losses of these structures. This is particularly true in very rural communities, where economic diversification has not occurred. The lack of resources for infrastructure investment limits investments in natural resource needs such as soil and water restoration, road maintenance, and fuels reduction.

Although the economic well being indicators are often weak and many rural counties are effectively using their social resources to provide an above average level of well being, successful approaches will require attention to both economic and social infrastructure at the community level.

6 Policy Options

Policy options for rising consumption and statewide limitations on California commodity output

- Develop an economic strategy that builds on comparative advantages of California industries vis a vis local and international economies.
- Promote more aggressive tax policies to favor development of innovative forest and rangeland technologies to meet production and conservation goals.
- Foster development of markets for new products and services, certification of wood and livestock products, and market mechanisms for carbon sequestration.
- Broaden remuneration methods to landowners for non-commodity products that complement commodity production.
- As a policy choice, accept further decline in forest and rangeland industries, reliance on imports, and probable land use changes towards development.

Policy options for meeting changing demands for recreation and open space

- Develop a coordinated plan to define needed statewide recreational expansion on forests and rangelands with protection of environment.
- Promote local community and government efforts to acquire and managed additional open space and recreational lands.
- Encourage relevant expansion of private land and service capacities.

Policy options for meeting costs of resource protection

- Develop an overall policy for California resources that integrates approaches to fuel reduction, fire detection and protection, and prevention and control of exotics and pests.

- Continue to provide wildland fire protection sufficient to protect watersheds, habitat, riparian areas, flood-prone areas, and other factors.
- Maintain state and federal capacities to respond to pests and public safety threats.

Policy options for incentives for private production of ecosystem services

- By policy, recognize the overall role of private landowners in producing ecosystem services.
- Focus on long-term plans and conservation easement conditions that clarify land tenure questions and are approved as alternatives under Forest Practice Rules that reduce compliance costs to landowners.
- Examine use of systems of environmental management that depends on certified, insured and guaranteed operations rather than a permit with civil enforcement.
- Develop watershed approaches to permits and restoration activities that reward landowners for attaining socially desired future conditions.
- Refine trading and credit system for habitat provision, pollution reduction, and carbon sequestration.

Policy options for maintaining large landholdings in resource industries

- Recognize the continued importance of large scale unfragmented ownerships in the working landscape that are dependent on resource based activities.
- Develop analysis of profitability limits at the industry levels and examine if state policies can be improved to assure both private and public benefits of large unfragmented holdings.
- Maintain tax policies that encourage retention of land ownerships in parcels that are economic to manage.
- Identify where new regulatory approaches are possible such as the use of environmental certification or long-range plans.
- Track the levels of management that will be permitted on federal lands and how they relate to overall resource supplies and protection strategies.
- Strengthen monitoring and adaptive management approaches for individual parcels as well as larger landscapes.
- Develop strategies to limit litigation costs by focusing on topics of common agreement such as exotics, pests, fuel reduction, and restoration activities.

Policy options for weak economies in local communities

- At the state level, promote diversification and strengthening of these communities and local economies.
- Foster community capacity to build restoration and other grants into support for local forest products, range, recreation, and ecosystem service industries.
- Continue to leverage existing local watershed groups and Fire Safe Councils.
- At the state level, develop additional supports to biomass industry.
- Identify, make available, and guarantee fuel supplies from some sections of public lands.

Governance

Goals and Benchmarks

- Encourage prudent forest management to serve public need for timber, with consideration of watershed protection, wildlife, and recreation (Z'Berg-Nejedly Forest Practice Act).
- Maintain regulation to assure productivity of timberlands are restored, maintained, and enhanced (Z'Berg-Nejedly Forest Practice Act).
- Protect and manage ecosystems, biological communities, and landscapes by developing and adopting a coordinated regional strategy that ensures protection of biological diversity and the maintenance of economic viability throughout California (California Biodiversity Council Memorandum of Understanding).
- Encourage investments based on expected harvests (California Timberland Productivity Act of 1982).
- Strengthen incentives, investment for enhance of forest resource productivity (California State Board of Forestry and Fire Protection Handbook, Chapter 0330, General Board Policy).
- Enlarge forestry research and information programs for factual decision making (California State Board of Forestry and Fire Protection Handbook, Chapter 0330, General Board Policy).
- Make and enforce such regulations as are necessary and proper for the organization, maintenance, government, and direction of the fire protective system for the prevention and suppression of forest fires (California Public Resources Code, Section 4111).
- Protect forest lands and aquatic resources and long-term conservation of productive forest lands by providing an incentive to owners of private forest lands to prevent future conversions of forest land and forest resource (California Public Resources Code, Section 12210, California Forest Legacy Program Act of 2000).
- Encourage private and public investments in, and an improved management of, forest lands and resources within the state to ensure adequate future high quality timber supplies, related employment, and other economic benefits, and the protection, maintenance, and enhancement of a productive and stable forest resource system for the benefit of present and future generations (California Public Resources Code, Section 4791 Part 2.5. Forest Resources, Chapter 1. Forest Resources Improvement).
- Encourage and support the development of coordinated and complementary strategies and solutions for watershed management across land ownership and agency jurisdictional boundaries (California Public Resources Code, Section 30907, Watershed, Clean Beaches, and Water Quality Act).

Policy Challenges

Complexity of regulatory oversight

Regulatory impacts on management activities are extensive on all forests and rangelands. Of the over 80 million acres of forests and rangelands, three-quarters have physical characteristics or zoning restrictions, such as steep slopes or riparian areas, that guide and often limit management activities such as timber harvesting, grazing, and water withdrawals. Increasing federal regulatory influence based on clean water, clean air, and species protection will continue to have an additional dominant impact on resource management on private and public lands.

Lack of policy coordination and integration

Multiple regulations sometimes work at cross-purposes and can discourage investment, incur substantial taxpayer funded regulatory costs, and add uncertainty that increases costs to landowners. Coordination and integration of policies, laws, and regulation particularly in the forest management, wildfire, and energy fields is needed to accomplish goals.

Conflicts over forest and rangeland management practices

Property rights and land tenure arrangements continue to be interpreted in the courts, suggesting continued contention between meshing environmental goals, property rights, and the enhancement of the public goods. In some cases, the socially valued conditions in contention will be harder to sustain on private forests and rangelands if regulatory requirements result in increasing operating costs and decreasing revenues that drive disinvestment or land use conversion.

Standardized, comprehensive information systems

The lack of standard information limits the ability to analyze needs, priorities, and program effectiveness. For example, watershed assessment often lacks consistent information, which may limit watershed value protection. Inadequacies ultimately lead to increased costs, duplication, and time delays regulatory incentive and market based systems. Additional committment is needed for information systems that facilitate monitoring and promote management strategies based on adaptive management approaches that effectively implement better approaches.

Coordination in research and information sharing

There is a need to coordinate research and effectively share and disseminate information. This will facilitate the adoption of new technologies and practices that could improve biological diversity, productivity, soil and water quality, and well being.

7 Policy Options

Policy options for levels of regulatory oversight and policy integration

- Conduct an analysis of the impact of overlapping mandates and review processes in an effort to streamline current structure.
- Connect policies for investment in energy and carbon sequestration to landowner incentives.
- Strengthen ability to use long term plans and forest certification to meet rules.
- Examine use of system of environmental management that depends on certified, insured and guaranteed operations rather than a permit with civil enforcement.

Policy options for conflicts over forest and rangeland management practices

- Focus on achieving agreement on desired landscape goals and then address potential practices and conflicts.
- Learn from experiences of The Nature Conservancy, other non-profits, and regional parks on how to explain management needs.
- Review role of environmental certification in providing for broader acceptance of management tools.
- Provide for public input and decision making and monitoring.
- Strengthen skills of resource professionals regarding public involvement and values.
- Continue strong support for focused management practices, such as fuel reduction and control of exotics and pests.

Policy options for limited coordination in research and information sharing

- Develop overall forest and rangeland research plan for California.
- Increase use of web-based portals for public access.
- Maintain the forest and rangeland extension functions at University of California and applied programs at California State University.
- Continue to hold research symposia to share results.
- Increase foundation support for research.

Policy options for standardized, comprehensive information systems

- Develop and maintain a system of recording easement boundaries and purposes in a central database.
- Continue to develop interagency agreements that set standards for information sharing and use.